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THESIS

AN ASSESSMENT OF THE EFFECTS
OF BUDGETARY LIMITATIONS ON THE
NAVY'S RATE STABILIZATION PROGRAM

by

William R. Niemeier

December 1978

Thesis Advisor:

A. C. Crosby

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This thesis examines the budget guidance concerning price inflation, analyzes its likely impact on the execution of the Navy's Maintenance of Real Property (MRP) program, and on the Rate Stabilization program at a Public Works Center.

The author concludes that such limitations will have significant effects on the Navy's RPMA functions and will cause problems in managing the stabilized rate program.

An Assessment of the Effects
Of Budgetary Limitations on the
Navy's Rate Stabilization Program

by

William R. Niemeier
Lieutenant Commander, Civil Engineer Corps
United States Navy
B.S., University of Missouri at Rolla

Submitted in partial fulfillment of the
requirements for the degree of

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from the
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December 1978

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In February 1978, acting on guidance provided by the Office of Management and Budget, Secretary of Defense Brown addressed several issues in his Annual Report which affected the management of the armed forces. Included among these issues was the establishment of ceilings on increases in the levels of certain budget elements.

In 1975 the services had been directed to institute a "Rate Stabilization" program wherein industrially-funded activities would be required to provide to their customers firm unit prices for various services well in advance of the fiscal year.

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I. RESEARCH PROBLEM

A. INTRODUCTION

The stated mission of the Navy shore establishment is to provide support to the operating units of the fleet. Such support takes many forms and in terms of real property is represented by a wide range of buildings, piers, airfields, utility systems and other facilities with a current value estimated at \$35 billion. The resources necessary to operate and maintain this vast complex of installations are authorized by the Congress on an annual basis as a part of the Operations and Maintenance, Navy (O+M,N) appropriation.

This thesis addresses itself to the subject of limits recently placed on allowances for economic inflation within the O+M,N budget. These limits, notably on contractually procured utility services can be expected to affect the Navy's ability to operate and maintain the shore establishment. In examining this new policy this thesis will attempt to (1) compare the inflation allowances provided for by the guidance with current and projected inflation figures, (2) assess the impact on the Navy's Real Property Maintenance Activity (RPMA) program and (3) determine the effects of the limitations on the rate stabilization program within a Public Works Center.

B. DESCRIPTION OF THE PROBLEM

Each year, the Navy submits a budget request to the Secretary of Defense which, when combined with the budget requests

of the other services and those of other executive agencies, becomes a part of the President's annual budget. The Navy's budget submittal includes funds required to procure new weapons systems, pay for military personnel and civilian employees and the resources needed to support current and planned operations. Within the Operations and Maintenance budget are resources needed to operate and maintain the Navy's shore establishment. These Real Property Maintenance Activities resources include four subfunctional categories: Maintenance and Repair of Real Property, Minor Construction, Other Engineering Support, and Utilities Operations.

On 2 February 1978, the Secretary of Defense in his annual report provided guidance to the services which imposed limits on allowable increases in budget requests for certain categories of expenses. The guidance, which reflects the recommendations of the Office of Management and Budget and the President's overall economic policy, places specific limits on percentage increases of certain budget items which are generally in line with the rate of general inflation. Table 1 presents the guidance provided and indicates the levels of annual allowances for inflation to be used in budgeting.

Table 1

<u>Fiscal Year</u>	<u>Percent Increase</u>
1977-78	7.0
1978-79	6.2
1979-80	6.0
1980-81	5.5
1981-82	5.5

The foregoing allowances as they apply to materials and contractual services create significant problems because those categories include the procurement of utility services. Since the Navy procures the great majority of its utility services, notably electricity and natural gas, by way of utility service contracts from private sector utility companies and because the cost of those utilities represents a significant portion of the cost of operating the shore establishment if the increases allowed in the budget for utilities is less than the actual cost of obtaining those services a funding shortfall will occur.

C. THESIS OBJECTIVE

It is the objective of this thesis to compare the allowed rates of inflation with current projections for the utility services used by the Navy and then assess the impact of funding shortfalls, if any, on the operations of the shore establishment.

Problems caused by a shortfall in funding for utilities are seen to be twofold. First, it would affect the overall accomplishment of the Navy's operations and maintenance goals to the extent that funds needed for continuing maintenance of existing facilities would be diverted to pay for utility costs beyond those provided in the budget. Second, because the limits established by the Secretary's guidance have also been applied to the rates charged by the Navy's Public Works Centers to its customers, if the costs actually incurred by the PWC in providing utilities to the customers exceeds the rates

allowed multiplied by the units demanded, the PWC will be forced to operate at a loss.

Under the recently instituted stabilized rate program which is applied to all Navy Industrial Fund (NIF) activities a Public Works Center is required to (1) establish fixed rates for services at levels which will allow the PWC to reach a break-even point at the end of the fiscal year, (2) publish those rates to its customer activities sufficiently in advance to meet the customers' budgeting requirements and (3) maintain those fixed rates throughout the fiscal year without change. A program which causes the PWC to knowingly establish rates which will be below its actual costs of providing the service could cause problems in executing the rate stabilization program as it was intended.

D. THESIS APPROACH

The approach to this thesis was threefold. First, an analysis of current and projected cost trends chiefly in terms of energy, was performed in order to assess their impact on future utility rates. Second, Navy budget data as submitted to the Secretary of Defense was analyzed assuming on the one hand, the use of expected utility costs as developed in the cost analysis, and on the other hand, the use of utility costs as limited by the escalation guidance. An assessment of the impact of funding deficiencies in the utilities area upon other real property maintenance activities was then made. Third, the cost escalation guidance was applied to the budget at Public Works Center, San Francisco

Bay to determine the impact of the guidance on the stabilized rate program.

II. BACKGROUND

A. THE BUDGET PROCESS

The budget is the device with which an organization translates its various programs into a plan for accomplishment. The budget represents the final quantified statement of the organizations' planned activities for its coming operating cycle and in a non-profit organization is the gauge by which performance is measured.

1. The Department of Defense Fiscal Cycle - An Overview

The Department of Defense (DOD) operates on a fiscal cycle which for any specific fiscal year spans approximately 29 months. The cycle consists of four distinct, time-sequenced phases including Planning, Programming, Budgeting and Enactment. Each phase is dependent upon the others.

The Secretary of Defense (SECDEF) is responsible for submitting to the President the annual budget which represents the resources required to carry out the various missions of the Department of Defense. In preparing for that budget submission the DOD uses two interrelated systems. The first system is the Joint Strategic Planning System which is the responsibility of the Joint Chiefs of Staff. The system calls for the preparation of a series of seven documents representing planning in three areas: strategy, intelligence, and research and development.

Based upon the outcome of the Joint Strategic Planning System and including some documents from the JSPS is the

second system, portions of which are of interest to this thesis. The Planning, Programming and Budgeting System (PPBS) in briefest terms is a system which, based upon the anticipated threat projected by the JSPS, develops a strategy to deal with that threat. To support that strategy, force requirements are developed to provide, on an orderly basis and over a specified period of time, the manpower, weapons systems and other resources needed. Funds are then budgeted so as to obtain the required forces and weapons systems within the authorizations provided by the Congress.

2. The Steps of the PPBS

The PPBS consists of a series of nine interrelated steps covering a period of about 18 months leading up to the submission of the DOD budget [Ref. 1].

- (1) The planning stage begins in May with the submittal of the strategy recommendations by the JCS to the SECDEF.
- (2) The SECDEF then issues strategic guidance.
- (3) The SECDEF issues tentative five-year fiscal guidance to the DOD components for their review and comment.
- (4) The JCS submit their forces plan to the SECDEF based on his strategic guidance. At this point, the forces plan is not yet fiscally constrained.
- (5) The SECDEF issues fiscal guidance to the DOD components by major force and support categories for each of the five program years. This step marks the end of the Planning phase.
- (6) The Programming phase begins when the JCS submit joint forces recommendations, rationale and risk assessments which are fiscally constrained in accordance with the SECDEF fiscal guidance.
- (7) The DOD components then submit their program objectives to the SECDEF, including forces and support, with rationale and risk assessment. These Program

Objective Memoranda (POMs) are fiscally constrained reflecting SECDEF guidance.

- (8) The SECDEF issues final program decisions after draft decisions have been reviewed and commented upon by the components. This step marks the end of the programming stage.
- (9) The DOD components based upon the final decisions and upon SECDEF budget guidance prepare and submit budget estimates for the fiscal year.

3. The Five Year Defense Program (FYDP)

The FYDP is the publication which records, summarizes and displays the decisions that have been approved by the SECDEF as comprising the DOD's program. It is intended to be a management tool that keeps management informed of what has been accomplished in the past and what is to be accomplished in the future.

The FYDP is designed to permit both broad aggregations and detailed presentations of data that are meaningful to different managers.

The plan is updated at least three times each year; after the Congress has enacted new annual legislation, upon the submittal of the President's budget, and upon completion and submittal of the POMs.

4. The Program Objective Memorandum

The POMs are based upon the strategic guidance prepared by the JCS and reflect the fiscal guidance issued by the SECDEF. POMs provide force, manpower, cost and material requirements and the rationale for proposed changes from the FYDP base and include risk assessments and advantages to be gained.

5. Budget Guidance to Field Activities

The operating budget originates at the activity level, which, in accounting terms is analogous to a responsibility center.

Normally in May or June the budget call goes out from the major claimant to the activities for the budget year under consideration. In the case of the FY1980 budget, the budget call was sent in May 1978 and directed the submission of budget figures for three years, the current year, FY1978, the next year, FY1979, and the budget year, FY1980.

The budget call provides guidance concerning the amount and type of budget data required, the format to be used, and submission timing.

Concurrent with or shortly following the budget call the major claimant provides to the activity annual planning figures for the years under budget consideration. These annual planning figures or "control numbers" indicate the maximum dollars and personnel end strengths which must not be exceeded in the budget submission. The numbers specified are derived from the DOD budget which would have been presented to Congress the preceding January.

The activity then prepares its budget to reflect the control numbers. Requirements which cannot be satisfied within the constraints of the control numbers are typically included as a narrative portion of the budget submission under the heading "unfunded requirements."

The budget, when complete, is forwarded up the chain of command via the expense limitation holder, if applicable, and thence to the major claimant. The aggregated claimant budgets are then forwarded to CNO for inclusion in the Navy O+M portion of the DOD budget.

6. Budget Approval

Budget approval is handled in somewhat reverse order to the budget submittal. After the DOD budget is approved by Congress in the forms of the Defense Authorization and Appropriations' Bills, the Department of the Treasury, with the approval of the General Accounting Office, issues a warrant which authorizes cash withdrawals from the treasury. The Appropriations Bill is provided to OMB for apportionment to DOD. Apportionment establishes the rate at which funds are authorized to be expended during the budget year with such authorization usually being released on a quarterly basis.

The apportioned authorization is then passed via the Secretary of the Navy to CNO. Within CNO the responsible office for O+M appropriations is the Director, Fiscal Management Division (OP-92). Obligation authority is then passed to the various claimants to the O+M appropriation, also known as major claimants, who subsequently assign obligation authority to the activities under their control in the form of operating budgets.

The Operating Budget at that point becomes the financial plan within which the activity must carry out its operations.

B. THE NAVY INDUSTRIAL FUND

The Navy Industrial Fund has its origin in the National Security Act of 1947 as amended by the Congress in 1949 in recognition of the need to promote "efficiency and economy" of operations of the newly established Department of Defense.

The Act included specific authorization (10 U.S.C. 2208) for the Secretary of Defense to establish working capital funds in the form of revolving stock funds, to provide supply support to the defense establishment, and industrial funds which, as the name implies, would provide various forms of industrial support.

During the next several years the Navy implemented the Navy Industrial Fund (NIF) concept at an increasing number of activities including research and development laboratories, ordinance facilities, shipyards, printing offices, the Military Sealift Command and Public Works Centers.

The establishment of a NIF activity requires that the Secretary of the Navy (Financial Management) with the approval of the Assistant Secretary of Defense (Comptroller) issue a specific charter. The issuance of the charter permits the Navy to capitalize and finance the new activity as a separate operating entity. The NIF activity then functions in much the same fashion as a commercial corporation, possessing its own assets, liabilities and equity. The equity of the NIF activity is known as the Corpus and represents the initial amount of working capital available to the activity to finance its operations plus retained earnings or minus losses incurred through operations.

In carrying out its mission, the NIF activity uses the Corpus as a revolving fund in that it is used initially to pay for goods and services (materials and labor) to perform work for customer activities. The customer activity is then billed, usually upon completion of the work, whereupon the Corpus is reimbursed out of the customers' appropriated funds. The aim of the industrial fund in this transaction process is twofold. First, because the NIF concept operates on a "full cost" system of accounting whereby all identifiable direct, indirect and overhead costs are collected and charged to the appropriate end-use job, it is essential that all costs be, in fact, identified and billed to the customer. Second, since the NIF is established as a non-profit operation, it is expected that the NIF activity will establish its rates for services at such a level that it will arrive at a break-even point at the end of each fiscal year.

Since it is unrealistic to expect an operation doing millions of dollars worth of business a year and providing a myriad of services to arrive at an exact break-even at the end of an operating year, the NIF system permits the rates for the subsequent year to be adjusted above or below the expected actual cost of the service to allow the shortage or surplus to be recovered.

There are a number of advantages put forth by proponents of the NIF system, some of which are as follows:

- (1) It establishes a contractual relationship between the NIF activity and its customer which encourages cost consciousness.

- (2) It simplifies financing through use of an accrual cost accounting system.
- (3) It increases the awareness of the customer as to the real cost of doing business.
- (4) It allows a more direct and rapid control of the quantity of support levels.

C. PUBLIC WORKS CENTERS

Public Works Centers are established in eight locations in the United States and Pacific Ocean area. They report to the Commander, Naval Facilities Engineering Command for management support. The typical PWC is established in a geographic area containing a large concentration of Navy shore facilities. It is the mission of the PWC to provide a full spectrum of public works services including facilities maintenance, minor construction, utilities, family housing, transportation, engineering support and shore facilities planning to all Navy operating forces and commands located within its area of responsibility.

The rationale for establishing a PWC at a given Navy complex relies upon several factors including the following:

- (1) The elimination of redundant facilities and equipment.
- (2) The reduction of duplicate overhead personnel.
- (3) The ability to provide a higher level of management expertise.

It is therefore the theory that these and other economies of scale will combine to produce cost reductions which will outweigh the undesirable impacts on those commands which stand to lose their internal public works departments.

Such was the case in the San Francisco Bay area. The Public Works Center, San Francisco Bay (PWCSFB) was established on 1 July 1974 with the mission of providing public works support to the Naval Air Station, Alameda, Navy Supply Center, Oakland, Naval Regional Medical Center, Oakland, Naval Support Activity, Treasure Island and the Oakland Army Base along with numerous smaller commands and activities.

The PWCSFB was used as the basis for a portion of this thesis because it provides the full range of services relevant to the study and because it is subject to cost behavior typical of most PWCs.

Public Works Centers, consistent with all NIF activities, utilize an accrual double entry bookkeeping system. The system is analogous to standard methods of accounting used in private industry and permits the use of common managerial accounting techniques. There are some exceptions, however, due to the different environment in which the PWC operates. For example, the PWC does not charge Federal Government customers for military labor or for depreciation of fixed assets. These costs are calculated and reported for statistical purposes only.

The accounting system does make use of a full system of ledger accounts, assets and liabilities, and a set of monthly and annual operating reports containing income statements and balance sheets.

Because of the utilization of the concept of full costing of goods and services and the ability to apply standard

managerial accounting principles, the PWC is better able to calculate the cost of its operations than is an activity using an appropriation-funded operating budget.

III. GUIDANCE CONCERNING INFLATION ALLOWANCES

A. SECDEF GUIDANCE

In a document titled The Department of Defense Annual Report to the Congress the Secretary of Defense provides an overview of the administration's defense policy and programs and includes justification for proposed levels of defense spending. The report covers a wide spectrum of issues dealing with strategic threat analysis, force levels, research and development, logistics, and manpower [Ref. 2].

Of interest to this thesis is a section dealing with the defense budget in which certain assumptions and projections are made which were used in developing proposed levels of budget authority. Specifically, the report deals with purchase price increases which were prepared on the basis of an index developed by the Department of Commerce. While the Assistant Secretary of Defense (Comptroller) ASD (C) was, at the time of writing of the annual report, working with the Commerce Department's Bureau of Economic Analysis to develop price deflators, or inflation figures, which would be keyed specifically to Defense purchases the Annual Report published figures available from the Office of Management and Budget. Based on those OMB figures, the Report projected cost trends for goods and services to be purchased by the DOD in future years as follows:

<u>Fiscal Year</u>	<u>Percent Increase</u>
1977-78	7.0
1978-79	6.2
1979-80	6.0
1980-81	5.5
1981-82	5.5

While the above figures are recognized as estimates they represent a guide to the Defense components for planning future budget levels and as such may be considered a statement of economic policy. The Report also published assumptions concerning future pay raises for the period FY78-83 as shown below:

	<u>General Schedule and Military Personnel</u>	<u>Wage Board Blue Collar</u>
FY78	7.05	7.9
FY79	6.5	3.4
FY80	6.4	3.4
FY81	6.1	6.1
FY82	5.7	5.7
FY83	5.4	5.4

B. NAVY IMPLEMENTATION OF POLICY

In the process of issuing guidance for preparation of budget input the Office of the Comptroller of the Navy (NAVCOMPT) transmitted to Major Claimants and to Navy Industrial Fund (NIF) activities the following planning figures which represent maximum levels allowed for inflationary adjustments to the budget base.

<u>Category</u>	<u>FY1979</u>	<u>FY1980</u>	<u>FY1981</u>
Classified Pay	5.5%	6.5%	6.0%
Wage Board Pay	3.4%	3.4%	6.0%
Materials, Contractual Services & other costs	6.3%	6.0%	6.0%
	above avg. costs in effect during FY1978	above avg. costs in effect during FY1979	above avg. costs in effect during FY1980

[Ref. 3]

It is the interpretation obtained by NAVFACENGCOM that the category which deals with Materials, Contractual Services and other Costs includes purchases of fuels for shore facility utilities and also includes utility services purchased through contract with commercial utility companies.

IV. PROJECTED COSTS OF GOODS AND SERVICES

It is generally accepted that the inflation allowances published in the Annual Report are either reasonably predictive of expected cost trends in general or, as in the case of wage increases, are manageable through offsetting legislation. However, it is the contention of NAVFACENGCOM that the allowances are not realistic in terms of the costs of procuring the various energy sources used in the shore establishment. These energy sources, generally known as utility services, are discussed in the following paragraphs.

A. UTILITY OPERATIONS DEFINED

Utility operations includes the cost of operating the Navy-owned utility systems and the purchase of utility services including electricity, steam and hot water, sewage treatment, potable water and other services from commercial utility companies, municipalities and other Defense or Government Departments. Excluded from the cost of utility operation is the maintenance and repair of the utility systems. In the case of Navy activities, either a Public Works Center or a Navy activity designated to serve in the role of a Public Works lead activity will own all the utility systems serving a geographic area. The utility system contains the various generating and production facilities, such as steam boilers and generating plants, plus the distribution system, such as wiring and piping, to carry the service to the customer's facility.

Operating costs are passed on to the customer, including the cost of maintaining the system, based on the quantity of each service provided to the customer multiplied by a unit cost rate, or price, established by the providing activity in accordance with NAVCOMPT instructions.

B. UTILITY UNIT COSTS

In view of the unsettled nature of the world's political and economic conditions and the uncertain future of energy legislation no authoritative source has been found to be willing to make long term predictions concerning future energy costs. One way to approach the problem, however, is to examine recent cost trends and using that information, tempered by a knowledge of likely future developments in the energy industry, attempt to project future cost trends.

The most widely accepted measure of historical cost trends is the Wholesale Price Index (WPI) as published by the Bureau of Labor Statistics. The following table represents selected WPI indices as of December of each year and compares those indices with the index for all commodities which is regarded to be the index of general inflation.

	<u>1970</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
All commodities	111	142	172	179	187	198
Coal	176	241	428	365	374	402
Natural Gas	109	138	177	246	338	422
Electrical Power	112	136	180	198	212	237
Fuel Oil	107	152	239	275	287	314

It is obvious that all the energy sources have increased in cost at a faster rate than the general inflation in recent years. The difference between the two rates is known as real price growth. Because national policy states that general inflation will be reduced to below 6% the difference between 6% and the costs actually experienced will be considered to constitute real price growth.

The following table displays the rates used to project cost accelerations for the near term future.

<u>Commodity</u>	<u>Assumed General Inflation</u>	<u>+ Real Cost Growth</u>	<u>= Acceleration</u>
Coal	6.0%	2.0%	8.0%
Natural Gas	6.0%	12.0%	18.0%
Electric Power	6.0%	5.0%	11.0%
Fuel Oil	6.0%	3.8%	9.8%
Propane	6.0%	3.8%	9.8%

The above acceleration figures are based solely on past performance and of themselves are not a valid indicator of the future. In order for them to be valid it is necessary that the economic factors affecting each of the commodities be examined and based on the assessment of probable future changes in those factors the acceleration rates must be adjusted as appropriate.

1. Coal

Coal is known to be this nation's most plentiful fossil fuel and it is currently the least expensive per million British Thermal Unit (MBTU).

Estimates of the coal reserves available in this country vary widely according to how various parameters, such as MBTU content per ton, sulfur content, depth of deposits, etc., are established. One study by the Rand Corporation [Ref. 4] places the known, economically recoverable reserves at some 278 million tons or about 200 times the current annual production rate. Even with a massive shift from oil to coal, the known high-quality reserves, easily mineable are expected to last at least 30 years. Thus we are not likely to see a major coal shortage in the near future.

Starting in the 1960's coal lost favor as an energy source because of problems with sulfur dioxide and other pollutants generally associated with burning coal. Also, as more and more users shifted to other fuels, the transportation system, principally the railroads, became more erratic in providing coal supplies. So, during the late 1960's and early 1970's the nation and also the Navy joined a trend of converting steam and heating plants from coal to fuel oil and natural gas with the result that the Navy's use of coal decreased from 1.4% of its total energy consumption in 1973 to 0.9% in 1977.

The Navy is now in the process of reconverting certain heating plants back to coal but this is an expensive process requiring MILCON funding.

The price of coal has been held at a fairly low level due to the weak demand experienced throughout the country. However, that may change. The President has established a

national goal of doubling coal production by 1985 which is expected to cause prices to rise. Coupled with the wage settlements granted the United Mine Worker last winter there is good reason to believe that the 2% annual real cost growth will continue.

2. Natural Gas

Natural gas has been used by the Navy in recent years as the fuel of preference primarily because of its relatively low cost per MBTU and also because of its clean burning characteristics. In FY1977 gas accounted for 13.3% of the energy used in the shore establishment [Ref. 5].

In FY1977 the price of natural gas increased at a rate of 25%, far faster than any other energy source. This is due in part to the increases in the regulated wellhead prices of new gas finds from \$.52 to \$1.42 per MBTU.

The current energy legislation would allow prices to rise by about 10% annually until 1985 after which price lids would be removed for most gas supplies. Most of these price increases are expected to be borne by industrial consumers which would include many Navy activities.

These factors, combined with diminishing supplies of gas are expected to continue to produce a real price growth of at least 12% during the next five years.

3. Purchased Electricity

During the period FY1973 to FY1977, the Navy shore establishments dependence on purchased electricity has increased from 35% of its total energy consumption to 53.3%.

This increase is largely due to the closure at many Navy shore facilities of their on-base generating plants and a shift to commercial power. In the days of relatively low-priced fuel, those activities could afford to continue to operate their own plants but, with increasing fuel prices and more stringent air pollution standards, the Navy was forced to either make some heavy capital investments in improved plants or take advantage of the economies of scale present in the commercial power system.

The price of purchased, or commercial electricity has been increasing at an average annual rate of 16.5%. In FY1977 the increase, according to the WPI was 11.8% indicating that the sharp increases experienced in FY1973 and FY1974 due to rapid price increases for imported fuel have levelled off to some extent.

The electrical industry has been and expects to continue experiencing previously unheard-of cost increases. In an industry-wide survey [Ref. 6] average fuel costs were found to have increased by 56% between 1974 and 1976 attributed mainly to the higher costs of imported oil.

The trend now and for the foreseeable future, according to the survey is a gradual shift away from oil and natural gas-fired generating plants to coal and nuclear plants.

Such a shift creates other problems. The capital investment per MegaWatt-Hour (MWH) for a coal plant in the size range of most plants is 35% higher than an oil plant and 300% higher than a gas plant. Investment per MWH for nuclear plants

is 65% higher than for coal plants. Further, the manpower requirements for operating a gas-fired plant are about 73% less than for coal.

To add to this problem, the electrical industry expects power demand to double within the next 10 to 12 years. As that happens, the total plant capacity on the system will also double with the result that fixed costs, principally the cost of money will become the major cost of electrical energy with about 60% of the cost of producing electricity at a coal or nuclear plant dedicated to retiring debt.

In view of the foregoing and in the absence of any evidence to the contrary it is felt that a prediction of a 5% increase in real cost growth for electrical energy is probably quite conservative.

4. Fuel Oil

In FY1977, fuel oil supplied 31.9% of the energy used in the Navy shore establishment, down from 50% in FY1973 due largely to increasing dependency on purchased electricity vice Navy generated electrical power.

The price increase of fuel oil, according to the WPI has averaged 20.2% per year from FY1973 to FY1975 with the largest increase occurring in FY1974 at 52.2%. In FY1977 the price increase amounted to 9.1%.

More than 50% of the oil now used in the United States is imported and that percentage is expected to grow to over 60% within five years. Thus, the price of most of the petroleum the nation needs will be under foreign control, principally

in the OPEC countries. It is not feasible to predict with any assurance how much those countries will be charging for their crude oil in future years but if history is a valid gauge, they can be expected to continue to increase their prices at a rate exceeding general inflation in the U.S.

Domestic oil sources are affected by the Federal Energy Policy and Conservation Act (EPCA) which allows the price of crude oil to increase by 10% per year.

In view of the diminishing supplies of domestic crude oil and the political and economic factors influencing the price of imported oil, it appears that an assumption of a 3.8% real cost growth is reasonable.

5. Other Fuels

Other energy sources, chiefly propane and purchased steam and hot water provide only 0.7% of the Navy's needs.

Since the prices of these products are tied either directly or indirectly to the prices of other fuels, notably fuel oil and natural gas, using a real cost growth factor of 3.8%, the lower of those fuels, would be a reasonable assumption.

V. OTHER FACTORS INFLUENCING COSTS

The cost to the Navy of obtaining utilities services is influenced on the one hand by the unit price of the utility commodity or service and on the other hand by the amount of the utilities consumed. At current (1977) average energy prices and at the rate of consumption currently experienced in the shore establishment an increase or decrease of 1% in energy consumption will affect total costs by about \$4 million. With savings of that magnitude attainable through the conservation of utilities it is easy to see why energy management is an urgent issue.

A. UTILITIES CONSERVATION

Subsequent to the oil embargo and ensuing energy cost increases in 1973 the Department of Defense instituted an energy conservation program. The initial goal of that program was to achieve a reduction in overall energy consumption of 15% below fiscal year 1973 levels. To monitor energy consumption and measure progress against that goal an automated reporting system known as the Defense Energy Information System (DEIS) was established [Ref. 7]. The Navy has succeeded in reducing utility energy consumption to meet that goal.

On 20 July 1977, however, by Executive Order 12003, the President directed all federal departments and agencies to reduce by FY1985 utility energy consumption an additional 20% as compared to FY1975 consumption.

While much of the initial reduction goal could be achieved through "voluntary" conservation measures and by means of relatively inexpensive modifications to utility systems, attainment of the 20% reduction will require significant additional investments in retrofits, new technology applications and other costly innovations. To highlight these requirements, the Navy has established a special investment program titled the Energy Conservation Improvement Program (ECIP). However, at the currently approved funding level of the ECIP it is estimated that only about a 9% reduction can be achieved [Ref. 8].

B. HYDROELECTRIC POWER

On a nationwide basis approximately 18% of the electrical energy produced in 1977 originated from hydroelectric plants according to the Federal Power Commission. These plants typically require an enormous capital investment when constructed but their operating costs thereafter are relatively low as compared to fossil-fueled steam plants. Because they are not dependent upon the use of oil, natural gas or coal the increases in their operating costs have approximated the overall WPI.

Hydroelectric plants are, of course, dependent upon adequate precipitation. While a drought affecting the entire nation is highly unlikely to occur, local dry periods such as occurred in the Western United States during 1976 and 1977 can severely reduce the availability of relatively cheap hydroelectric power.

During that drought, power systems such as those in California which are heavily dependent on hydroelectricity were forced to depend more on their fossil-fueled plants for production with attendant higher operating costs.

The utility costs projections developed in Chapter IV are based upon the assumption that adequate rainfall will occur to permit full use of hydroelectric generation so that any significant and widespread drought would act to increase the projected figures. Such increases would be dependent on the severity and extent of the drought and could only be measured as they are experienced.

VI. RATE STABILIZATION

A. BACKGROUND

Until the year 1973, the process of determining rates for goods and services within Public Works Centers was relatively easy or, at least, most PWCs managed to arrive reasonably close to a break-even financial position without excessive rate adjustments during the year. In the simplest of terms, rate determination involved first the estimation of the amount of work which would be required by customer activities in order to calculate the amount of overhead charges to be applied to each direct labor hour. This workload was usually not significantly different from previous years so much of the estimating was done on an exception basis. Rates for direct labor and materials were generally predictable to the extent that allowances for inflation could be foreseen with some assurance.

With the occurrence of the Arab oil embargo in 1973 and other materials' shortages, the industrial world began experiencing large perturbations in the cost of their operations. The natural response of the PWC, under its existing charter requiring that all identifiable costs be recovered from the customer, was to adjust their rate upward to cover the increased costs. It was not unusual for a PWC to issue such upward rate adjustment notices to its customers on a monthly basis. In some locations the rate for electricity more than doubled during the year.

The effects on customer activities were catastrophic. Appropriated funded activities operate on an essentially fixed income and are limited by law to the funding limits established by their operating budgets. Thus, the managers of the customer activities were forced to curtail other activities in order to pay for utilities. The result was that a considerable amount of needed maintenance and other essential work was postponed or eliminated.

Faced with this situation, Department of Defense (DOD) managers determined that one of two things could be done. The first approach would involve no action, with the NIF rates being allowed to continue to fluctuate and the customer activities continuing to absorb the losses. The second alternative would have the NIF activity fix, or "stabilize" its prices and then absorb the gains or losses. Thus evolved the concept of rate stabilization.

B. IMPLEMENTATION

The rate stabilization program commenced on 1 July 1975 for all DOD industrial funded activities [Ref. 9]. The stated purpose of rate stabilization was to provide to customer activities firm prices for goods and services sufficiently in advance of the fiscal year to permit consideration in their budgets and then, more importantly, to maintain those price levels throughout the year of budget execution.

Excerpts from NAVCOMPT Instruction 7600.22B reflect the current policy on stabilized rates as published on 6 June 1978:

Each activity will establish fixed rates which may be expressed as costs per man-hour, man-day, unit of output, unit of input, or any other manner which best suits the nature of the effort. An activity may have a single rate or as many rates as are warranted. The activity group commander will approve the number and kind of rates to be established based on each activity's organizational structure, diversity of workload and other management considerations.

In developing and establishing rates, each activity will adhere to the principle of aligning rates to recover operating costs. An activity should devise a sufficient number of rates to ensure that the rate system is a reasonable model of the actual cost of performing the various categories of work or services covered by the rates. Stabilized rates submitted by the activities will be reviewed and adjusted by the activity group manager, to provide the necessary changes to offset the total prior year gains or losses thereby achieving zero profit and loss in the Accumulated Operating Results Account of the activity group. Gains and losses will normally be fully offset during the year following their occurrence, and will be reflected uniformly in the rates of the activity group. Changed conditions resulting from the Office of the Secretary of Defense review of the activity group managers' A-11 Budgets, and changes in the customer programs occurring during the budget review cycle will result in stabilized rates being again reviewed and additional changes made where appropriate.

Rates established in compliance with this instruction are expected to remain in effect for an entire fiscal year, with the exception of those established by shipyards. Shipyards will use approved stabilized rates to bill overhaul, repair, and alteration starts throughout the entire period of the execution of the reimbursable order, regardless of the number of fiscal years involved. Gains and losses from application of stabilized rates in prior year shipyard programs will be scoped for full offset at the conclusion of the budget year program. In all other instances, the stabilized rates approved for the current fiscal year will be used to bill customers (sponsors). Rate changes, during a fiscal year, are expected to be rare, and may be only upon approval of the Assistant Secretary of Defense (Comptroller). Requests for rate changes will be submitted via chain of command, and must be accompanied by appropriate justification.

C. SCOPE OF APPLICATION

Rate stabilization as a management concept is currently required of all NIF with the exception of certain functions such as the Navy's centrally managed aircraft RDT+E programs.

Further, certain other services when provided by any NIF activity are exempt from the rate stabilization program as follows [Ref. 9]:

- (1) Cost of work performed and services provided to Foreign Military Sales Customers.
- (2) Cost of services provided to private parties and other non-Federal Government customers.
- (3) Contractual services procured for the benefit of only one customer.
- (4) Base closure costs.

Also exempt is the cost of materials used in performing work and providing services in the following categories of activities:

- (1) All RDT+E activities.
- (2) All specific maintenance projects.
- (3) All Navy Shipyard work performed on non-ship projects except certain work performed on non-ship component overhaul and non-ship work performed by the Shipyard Public Works Department.
- (4) All work to provide additions and improvements to plant projects.

Within a Public Works Center the stabilized rate program has been applied to most of the rates also referred to as "predetermined rates" and at PWC San Francisco Bay they encompass the following categories of services:

- (1) Electricity
- (2) Water
- (3) Steam
- (4) Sewage
- (5) Industrial Waste
- (6) Natural Gas
- (7) Compressed Air
- (8) Certain Telephone Systems
- (9) Emergency Service
- (10) Pest Control
- (11) Driver's License/Renewal
- (12) Refuse Collection and Disposal

D. PROCEDURES FOR MANAGING THE STABILIZED RATE PROGRAM AT THE FIELD LEVEL

The Comptroller of the Navy issues policy and procedure guidance for the rate stabilization program. The policy concerning recovery of costs, review of proposed rates by higher echelons of command and applications for rate charges were covered earlier.

At the Public Works Center level, the program can be viewed as a series of overlapping actions each keyed to a specific budget year. For example, as explained by Mr. R. Klembith, the Comptroller at PWC San Francisco Bay, the process for fiscal year 1980 begins in July 1978 when the PWC submits its budget known as the A-11 budget, in reference to the Office of Management and Budget (OMB) circular A-11. The budget at this point contains the firm rates for fiscal year 1979 and the tentative rates for 1980.

Then, in November, the Comptroller requests the submission of fiscal year 1980 operating budgets from the various PWC department heads. Those inputs are then combined along with other data and after reconciliation of differences to determine the firm fiscal year 1980 rates.

The fiscal year 1980 budget submitted to NAVCOMPT via NAVFACENGCOM in January contains the firm 1980 rates and the tentative 1981 rates. This January submission is the last opportunity for the PWC to change its FY1980 rates. It is at this point that the rates become "stabilized" and can be used as the basis for budget submissions by the customer activities.

E. IMPACT ON PUBLIC WORKS CENTERS

The implementation of the stabilized rate program caused some predictable problems particularly in the early years of its operation. The challenge of predicting costs nearly two years in the future with the knowledge that the rates based on those costs would have to remain in effect for the entire budget year added some anxiety to the budget preparation process. In practice, however, the program is now seen to be less threatening than originally expected and in fact has some advantages to the PWC.

First, with the exception of utilities, the projection of future cost behavior has not been found to be as difficult as expected. Either costs have followed a fairly constant and predictable growth rate or relief has been provided by NAVCOMPT to allow for the lack of control at the field level.

For example, budget guidance issued by NAVCOMPT fiscal year 1980 indicated that the PWCs should prepare their budgets based upon an ungraded wage rate increase of 3.4%. At such time as the wage increase is determined through local wage surveys, the corpus of the PWC will be reimbursed for the difference.

Utilities on the other hand remain the chief problem with the stabilized rate program. It was shown in Chapter IV that the cost of utilities on a nationwide basis has been increasing at a rapid rate and some overall predictions were made as to its future performance. At the level of the individual PWC however, the uncertainty of predicting future costs is greater.

Most Navy utilities are procured through the local utility company. In the case of PWC San Francisco Bay, electricity and gas are purchased from Pacific Gas and Electric (PG&E). As a public utility, PG&E must apply to the Public Utilities Commission (PUC) for approval of changes to its billing rates. Because the PUC has been known to have some political motivations, the approval of rate changes are usually uncertain both as to amount and timing. The result of that uncertainty is that PG&E will not provide rate projections more than five or six months in the future.

The PWC therefore is left with the task of preparing a budget which establishes rates based on projections with a high degree of uncertainty. A local increase of a utility rate in the San Francisco Bay area would probably not influence the average cost of utilities on the national level but

it could have serious impact on the PWCs rate structure.

From a pragmatic viewpoint of budget preparation, however, the rate stabilization program has caused no increased problems in establishing rates. Faced with an essentially imponderable future, the PWC can only analyze local and national conditions and to the extent possible make its best guess of future events. While this approach may appear somewhat unscientific it is probably as reliable as any other system.

Therefore it can be concluded that the rate stabilization program has caused no unmanageable problems or at least none which can be controlled. On the other hand, some advantages have been noted.

In an interview with Mr. Klembith he observed that the requirement that the stabilized rates must remain constant tends to eliminate some of the workload on his staff formerly caused by having to recalculate rates during the fiscal year.

Since the focus of management interest under rate stabilization should be directed away from making the rates charged to customers meet the costs incurred by the PWC it would follow that management effort would now be directed more upon keeping costs within the bounds of the rate structure through more efficient operations.

F. IMPACT ON CUSTOMER ACTIVITIES

Interviews with representatives of customers of PWCSFB reveal that from their viewpoint the stabilized rate program is operating as intended. Given that the purpose of rate

stabilization is to provide to customers of NIF activities firm unit prices for goods and services in order that they might more effectively manage their resources, the program is effective.

1. Advantages

The chief advantage of the stabilized rate program to the customer is obviously the capability it provides to the customer to plan the use of his resources. Considering that the cost of goods and services procured from a PWC is comprised of two factors, i.e. unit cost (rate) and quantity (number of units), either of which were variable in the past, the ability to treat the unit price as a constant as in the stabilization of rates means the customer can concentrate his management efforts on the only remaining variable and be able to predict the outcome of decisions with greater assurance.

2. Disadvantages

The only disadvantage to the program noted by customer activities stems from the requirement for the PWC to strive to reach a break-even financial position at the end of each fiscal year. Because the establishment of predetermined rates depends on some predictions of future events, the rates seldom, if ever, exactly correspond to costs. Thus, the PWC will expectedly end each fiscal year with some gain or some loss which must be amortized during the succeeding year. This causes an upward or downward step in the various predetermined rates which is unrelated to normal inflation or other predictable factors.

Thus the problem for the customer is one of fluctuating rates from one fiscal year to the next. In this case, a significant decrease in rates as experienced in fiscal year 1979 at PWCSFB (Appendix 1) can conceivably cause problems with subsequent years budgeting in that it might appear that a new lower budget base had been established.

This facet of the program was seen more as an inconvenience to the customer than as an unmanageable problem, requiring that the customer activity make it known to its major claimant that apparent savings for one year do not necessarily mean equal savings in the following year.

VII. IMPACT OF GUIDANCE

A. PURPOSE

It is the purpose of this chapter to address the central issue of this thesis which is how and to what extent the uniform inflation guidance affects the Navy. As previously stated, the analysis will concentrate on utility funding and the impact of shortfalls in funding for utilities on the other segments of the Real Property Maintenance Activities. This limitation is established for the following reasons:

1. The analysis is limited to utility costs because of the categories of costs addressed by the SECDEF guidance described in Chapter III, only utility costs are considered uncontrollable. Obviously if a cost is controllable, management action will likely be taken as necessary to bring costs within the limits prescribed.

2. The analysis is limited to the RPMA portion of the O+M,N budget because history has shown that when funding shortfalls have occurred due to utility funding problems, the majority of the deficiency was recouped in the remaining RPMA areas.

B. PROCEDURE

This Chapter will analyze the effects of the inflation guidance in several steps:

- (1) Show the kinds of utilities the Navy uses, the amounts and average unit costs, and the annual cost of utilities.

- (2) Apply the predicted real cost growth factors from Chapter IV to those quantities and compare those costs with the allowable increases for general inflation only.
- (3) Describe the ways in which the Navy determines the desired level of the RPMA program and the basis for budgeting for RPMA support.
- (4) Apply the funding shortfalls from utility operations to the remaining RPMA program as budgeted and assess the impact on a Navy-wide basis.
- (5) Trace the flow of RPMA funds to a hypothetical Navy activity served by a Public Works Center and assess the impact of funding perturbances.
- (6) Examine the rate structure of PWC San Francisco Bay and analyze the effects of budget guidance on the PWC's stabilized rate system.

C. UTILITY CONSUMPTION

The following figures extracted from the DEIS II report represent total Navy (less Marine Corps) shore establishment utility consumption based on actual amounts reported through the third quarter 1978 plus estimated amounts for the fourth quarter. All amounts are shown in MBTU's (BTU x 10^{12}):

<u>UTILITY</u>	<u>AMT MBTU</u>	<u>UNIT PRICE</u>	<u>TOTAL COST</u>
Purchased Elec.	80,511,134	2.85	222,456,700
Fuel Oil	51,811,454	2.70	139,890,900
Natural Gas	23,865,298	2.20	52,503,700
Propane	298,143	4.67	1,392,300
Steam & Hot Water	1,200,731	4.47	5,367,300
Coal	1,549,866	1.79	2,774,300
Composite	159,236,626	2.71	431,385,200

Appendix 2 illustrates the amounts of various utilities consumed as percentage of total energy consumed.

D. PREDICTED COSTS OF UTILITIES

The cost of Navy utilities can be predicted using several assumptions. Appendix 3 shows projected utilities costs for fiscal years 1979, 1980 and 1981 using the real cost growth plus general inflation figures developed in Chapter IV and assuming no energy conservation beyond that achieved in FY1978. Appendix 4 illustrates the increases in costs of utilities assuming the accelerated cost growth and an energy conservation program achieving reductions of 1% in FY1978, 1% in FY1980 and 2% in FY1981. These reduction figures are generally in line with the current Energy Conservation Investment Program (ECIP) goals assuming the program is fully funded. Appendix 5 provides the costs of utilities predicated on the guidance provided by DOD, i.e., allowing for general inflation only and assuming no energy conservation.

Appendix 6 shows the costs of utilities again using general inflation only but assuming a fully funded ECIP. It can be seen from the totals derived from the preceding calculations that with or without the ECIP significant shortfalls will occur if budgets are restricted to allow for general inflation only. The shortfalls in millions of dollars are as follows:

	<u>FY1979</u>	<u>FY1980</u>	<u>FY1981</u>
With ECIP	21.3	46.3	76.0
Without ECIP	22.3	47.9	79.0

E. THE RPMA BUDGET

In analyzing the effects of a funding shortfall in utilities on the overall RPMA program it will first be necessary to understand what the program is composed of and how its size is determined.

RPMA resources are needed to support four subfunctional categories of facilities management.

1. Maintenance and Repair of Real Property (M)
2. Minor Construction (R)
3. Other Engineering Support (P)
4. Utilities Operations (N)

1. Maintenance and Repair

The maintenance and repair function deals with securing those resources necessary to perform the upkeep required to protect the Navy's investment in the shore establishment. The system of determining optimal levels of maintenance and repair funding involves analyses of several factors indicative of the material condition of shore facilities.

a. Investment Categories (I.C.) - a system of classifying facilities as to their purpose or mission such as IC1, Aviation Operational; IC2, Communications Operational; IC5, Training, etc. This concept has been used for a number of years in managing the Military Construction (MILCON) program but it has been in use in the RPMA program only since FY1978. The purpose of developing the IC system is to help forecast current and future resource requirements with evidence substantiated by supportable analyses. The input for

such analyses includes three primary factors, the Current Plant Value (CPV), the average age of facilities within the IC, and the Backlog of Maintenance and Repair (BMAR).

b. The BMAR represents the end of the fiscal year measurement in dollars of the maintenance and repair remaining as a firm requirement to maintain the facilities in good condition and which the installation had firm plans to accomplish but for which a lack of resources existed. It has in past years been a somewhat controversial measurement because it implies that the installation managers actually know what all the deficiencies are. The theory of the BMAR system, however, is that the level of the BMAR at the end of successive fiscal years provides a gauge of facility condition. In that respect, if the BMAR grows from year to year it indicates a growing backlog of maintenance work and a deteriorating shore facility. It is the goal of the RPMA program to secure resources sufficient to reduce the BMAR in all ICs to zero by end of fiscal year 1989.

c. The Annual Inspection Summary (AIS) is a report which annually summarizes the estimated value of facility deficiencies at some point in time. The input for the AIS is generated through a process of continuing inspection of facilities. As deficiencies such as a need for painting, chuckholes in roads, leaking water line, etc., are identified the estimated cost to accomplish the repairs is recorded. At the time repairs are accomplished the item is removed from the records. Thus the AIS reports the maintenance and repair work

that has been identified and estimated but which remains to be corrected. At least two problems exist with the AIS; first, the inspection of facilities is frequently hampered by a lack of resources in the form of personnel, so the inspections are often superficial and only the obvious deficiencies are recorded; second, many facilities such as underground storage tanks and buried pipelines cannot be inspected without great effort. Thus, the AIS does not reflect the condition of those facilities even though they may be on the verge of failure.

The AIS is submitted as a report by the Navy installation to its claimant. The contents of the AIS are used both by the installation in planning its maintenance and repair work plan for the year (subsequently leading to the BMAR) and by the major claimant as a means of supporting requests for RPMA funding.

When the inputs from these various sources is collected and integrated they provide managers with a series of facilities profiles which illustrate relative levels of age, CPV and states of maintenance among the various investment categories and which also indicate trends from year to year as to the overall maintenance program.

2. Minor Construction (R)

The minor construction function provides funds for those small projects for construction of new facilities or alterations or modifications to existing facilities which can be accomplished for \$100,000 or less. Projects beyond

that scope must be accomplished as Urgent Minor Construction Projects or through regular MILCON programming.

3. Other Engineering Support (P)

Other engineering support functions include fire protection. Public Works Administration (including inspection), custodial services, pest control and service work.

Before assessing the impact of utilities funding shortfalls on the RPMA program it is necessary to examine the MRP (M and R categories) portion of the RPMA program as it is now structured.

The POM-80 submission proposed MRP funding levels on three levels as prescribed by the Zero Base Budgeting (ABB) concept. Those levels are the basic, or recommended level, the enhanced level and the decremented level.

The rationale for arriving at these levels is:

- (1) The basic level would allow a reduction of BMAR to zero in three critical ICs, aircraft, waterfront and utilities facilities by FY1984 and a reduction of BMAR in all IC to 0.5% of CPV by FY1984.
- (2) The enhanced level would cause a reduction of BMAR to zero in all ICs by FY1984.
- (3) The decremented program level would reduce BMAR to zero in all ICs by FY1999.

The proposed levels of (M) funding are as follows (figures in \$ millions):

	<u>FY1979</u>	<u>FY1980</u>	<u>FY1981</u>
Enhanced	N/A	487.4	515.0
Basic	N/A	450.1	475.5
Decremental	N/A	388.7	405.1

The previously approved Five Year Defense Program (FYDP) provided for funding levels somewhat lower than the POM basic levels (figures include maintenance and repair and minor construction).

	<u>FY1979</u>	<u>FY1980</u>	<u>FY1981</u>
Funding	N/A	400.00	420.9

The resolution of the differences between the levels of funding are the subject of months of examining alternatives and negotiating of tradeoffs between OPNAV and DOD representatives. The analysis of that procedure in any depth could be the subject of a thesis in itself. In the case of the POM-80 the results of the "end game" to MRP were published in July 1978 by the Navy Cost Information System. The figures indicated below represent the update to the FYDP and reflect basic program levels as of 25 July 1978.

	<u>FY1979</u>	<u>FY1980</u>	<u>FY1981</u>
Maintenance & Repair	349.0	381.7	423.9
Shortfall from Recommended Basic Level	N/A	68.4	51.6

In short, the new basic levels of maintenance and repair funding are approximately at the decremented level as shown in the POM-80.

The effects of a shortfall in utilities funding, if compensated for from other RPMA functions can only serve to further aggravate this situation. It has been estimated that a funding level for MRP programs should be equal to

1.2% of the current plant value. This criterion is based on analyses performed by OPNAV indicating funding levels below 1.2% on a continuing basis will result in a net consumption of the plant value.

Applying that factor to the CPV figures projected by the POM-80 produces the below-listed optimum levels of MRP funding (amounts in millions of dollars):

	<u>FY1979</u>	<u>FY1980</u>	<u>FY1981</u>
CPV	32,300.00	34,528.2	36,673.5
Optimum MRP Funding	387.6	414.3	440.1

Using the standard of 1.2% of CPV as the desired level of MRP funding and deducting the 43% of Navy utilities which are funded by O&M the shortfalls can be shown as follows:

	<u>FY1979</u>	<u>FY1980</u>	<u>FY1981</u>
Optimum Funding Level	387.6	414.3	440.1
Currently Programmed Funding	349.0	381.7	423.9
Utilities Shortfalls With ECIP Funded	9.2	19.9	32.7
Degraded Funding Level	339.8	361.8	391.2
% of CPV	1.0	1.0	1.0

From this data it is clear that if the expected shortfall in funding for utilities is compensated for out of MRP funds, and if that practice continues over a period of several years, the result will be some deterioration of the level of maintenance needed to maintain shore facilities in good working order.

F. EFFECTS ON A NAVY INSTALLATION

The effects on an individual Navy installation of a utilities funding shortfall would be nearly impossible to measure with any accuracy. It is safe to assume, however, that if the Navy's overall O&M budget must be dedicated on an increasing basis to paying for utility operations the net result to an installation will be a reduction in funding available for other than utilities.

G. EFFECTS ON A PUBLIC WORKS CENTER

The inflation limits imposed by the Secretary of Defense and subsequently passed on to all NIF activities by Ref. 3 will affect Public Works Centers in two fundamental ways. First, the customer activities will feel the effects of the process described in Section F to the extent that they will have less funds to accomplish maintenance and repair work. This may mean some restructuring of the workload of the PWC.

The second effect can be more directly measured since it deals with the formulation of the predetermined, or stabilized rates of the PWC. The purpose of the establishment of rates is that the rate should be just sufficient to recover the costs incurred by the supplying activity. It follows that any restrictions imposed on establishing equitable rates will have some detrimental effect.

In the case of PWC San Francisco Bay, as with other PWCs investigated, the picture is clouded somewhat by the existence of operating gains from previous years. PWCSFB, for example, ended FY1978 with a net operating gain or profit of about

\$3.8 million. Appendix 7 shows the history of retained earning at the PWC. The large gain during FY1978 is primarily due to savings in purchased electricity which were not anticipated when the rates were developed. Two factors acted to reduce expenses:

1. At the time the predetermined rates were developed, California was experiencing a serious drought. Hydroelectric power, which provides 29% of the electrical energy in California was being curtailed and hydrology reports predicted that even with normal rains during the winter of 1977-78, hydroelectric would still be partially curtailed. As it happened, the rainy season was about twice as wet as normal and the curtailment of hydroelectric was ended, meaning electrical rates did not increase as much as predicted.

2. One of the installations served by the PWC was included in a power pool contract with the Bureau of Reclamation. Through this contract, power for that installation is billed at a much reduced rate thereby reducing costs to the PWC and eventually to all its customer activities. Both these events can be considered to be anomalies since it is unlikely that similar fortuitous happenings will occur in the future. Therefore, if it is assumed that the retained earnings can be reduced to zero by the end of FY1979 the PWC will be faced with operating under the limits of the SECDEF guidance. That guidance as transmitted by Ref. 3 would prescribe limits on increases in rates in the A-11 budget of 6.0% per year.

Data gathered from PWC memorandum records, Appendix 8 indicates that purchased electricity rates have increased by about 150% in three years. Natural gas prices have increased 98% during the same period. These increases are clearly in excess of general inflation so if the rate increases allowed the PWC are held to general inflation rates it can be assumed that operating losses will occur.

In order to measure the potential losses it is necessary to ignore the existence of excess retained earnings and assume that the PWC is now at a break-even position. It is then possible to construct a rate based on general inflation growth and a rate based on real cost growth. Then, by knowing the volume of services provided an operating loss due solely to the budget guidance can be estimated.

The Utilities Cost Analysis Report (UCAR), a section of the PWCSFB Financial and Operating Statements for July 1978 shows that the purchase price of electricity represents 94.7% of the total electricity cost to the PWC with the remaining 5.3% represented by the cost of distribution. For natural gas the costs are 92% for purchases and 8% for distribution. Therefore, the distribution expenses, being mostly labor, can be expected to increase at roughly the general inflation rate and the purchases can be expected to increase at the rates previously developed for real cost growth-plus inflation [Ref.10].

With the benefit of hindsight, that is, knowing what the FY1978 actual average unit cost was, rates for electricity and gas can be constructed on a break-even basis and then

those rates can be projected to isolate the effects of the budget guidance. For the purposes of this analysis, the allocation of overhead is considered irrelevant because it would be the same under either alternative.

1. Electricity - the rate necessary to cover costs in simple terms can be represented by:

Purchase Price (P) + Distribution Cost per MWH (D) = Rate (R)

If D = .053 R

And P = .947 R

$$R = \frac{P}{.947} = 1.056 P$$

The average unit price for purchased electricity during FY1978 was \$37.27/MWH (Appendix 8) so a break-even rate would be \$39.36/MWH.

The rates allowable for FY1979 through FY1981 using general inflation only would be:

FY1979	\$41.84
FY1980	\$44.35
FY1981	\$47.01

Using the average production figures for three previous years and applying energy conservation reductions of 1% for FY1979, 1% for FY1980 and 2% for FY1981.

Revenues and expenses would be:

FY1979	186,085	x	.99	x	41.84	=	7,707,938
FY1980	184,224	x	.99	x	44.35	=	8,088,631
FY1981	182,382	x	.98	x	47.01	=	8,402,302

The same calculations using real cost growth produces

somewhat higher rates:

FY1979	39.36	x	.053	x	1.063	+	39.36	x	.947	x	1.11	=	\$43.59
FY1980	43.59	x	.053	x	1.06	+	43.59	x	.947	x	1.11	=	\$48.27
FY1981	48.27	x	.053	x	1.06	+	48.27	x	.947	x	1.11	=	\$53.45

Under this assumption revenues would be:

FY1979	186,085	x	.99	x	43.59	=	8,030,330
FY1980	184,224	x	.99	x	48.27	=	8,803,567
FY1981	182,382	x	.98	x	53.45	=	9,553,351

Thus a PWC of the size of PWCSFB could expect operating losses of about \$320,000 in FY1979, \$715,000 in FY1980 and \$1,150,000 in FY1981 due to the imposition of restrictions on electrical rates.

2. Natural Gas - Calculations similar to that for electricity are used to determine natural gas rates.

Purchase Price (P) + Distribution Cost/MBTU(D) = Rate (R)

$$P = .92R$$

$$R = 1.09P$$

The average unit price for FY1978 = \$2.25/MBTU

Allowable rates for the next three years would be:

FY1979	\$2.39/MBTU
FY1980	\$2.54/MBTU
FY1981	\$2.69/MBTU

Again using average production figures and applying energy conservation factors revenues would be:

FY1979	528,248	x	.99	x	2.39	=	1,249,888
FY1980	522,965	x	.99	x	2.54	=	1,315,048
FY1981	517,735	x	.98	x	2.69	=	1,364,853

Using real cost growth plus general inflation rates would be:

$$\text{FY1979} \quad 2.25 \times .08 \times 1.063 + 2.25 \times .92 \times 1.18 = \$2.63$$

$$\text{FY1980} \quad 2.63 \times .08 \times 1.06 + 2.63 \times .92 \times 1.18 = \$3.08$$

$$\text{FY1981} \quad 3.08 \times .08 \times 1.06 + 3.08 \times .92 \times 1.18 = \$3.60$$

Revenues would then be:

$$\text{FY1979} \quad 528,248 \times .99 \times 2.63 = 1,375,399$$

$$\text{FY1980} \quad 522,965 \times .99 \times 3.08 = 1,594,625$$

$$\text{FY1981} \quad 517,735 \times .98 \times 3.60 = 1,826,569$$

Again, as with electricity, losses would be realized by the

PWC. In this case costs would exceed revenues by about

\$125,000 in FY1979, \$275,000 in FY1980 and \$500,000 in FY1981.

VIII. CONCLUSIONS

The imposition of uniform inflation limits for goods and services without allowance for the more rapidly increasing cost of energy sources creates some serious problems for the Navy in carrying out its mission.

First, if budgets for utilities are limited to increases equal only to the rate of general inflation funding deficiencies will occur. Because the unit cost and the rate of consumption are, to a large degree, uncontrollable by the Navy if it is to carry out its missions, the cost of energy related utilities will exceed the amounts budgeted and the deficiencies will have to be offset by migrating funds from other O&M programs. In the past this has been done in part by deferring maintenance and repair work with the result that significant backlogs of maintenance work have built up. If this practice continues in the future, the overall material condition of the Navy's shore facilities will continue to suffer.

Second, when the same general inflation limits are applied to a NIF activity, particularly a Public Works Center heavily involved in providing energy dependent utilities, the rate structure of that activity is distorted. The arbitrary limitation of rate increases regardless of the rapid increases in costs to the PWC will cause operating losses and a draw-down of the NIF Corpus.

Placing limits on utility rate increases may appear to protect PWC customer activities from rapidly escalating energy costs but that is a false impression.

Because the PWC, as a NIF activity is supposed to operate on a break-even basis and because each individual predetermined rate is supposed to stand on its own, i.e. expected losses to one rate may not be recovered by intentionally gaining in another, the net result, all other things being equal, will be an operating loss for the PWC. If rates for the subsequent year are again arbitrarily limited continuing losses will occur probably necessitating eventual subsidation of the Corpus. That subsidy would likely be made up from the Navy's O&M budget so, in any event, the Navy will pay the prevailing rates for its utilities.

IX. RECOMMENDATIONS

It would appear that there exists a limited number of alternatives to alleviate the problems cited in Chapter VIII. The most obvious and effective solution to the problems affecting the O&M budget is to seek relief from the limitations placed on utility procurement. Such relief would allow budgets for utilities to increase at rates consistent with real life.

Failing that, the Navy will likely have to deal with a situation in which other essential programs will have to be curtailed. An early identification of those programs and prompt action to cut back their scope may help to minimize the detrimental effects of the funding shortfall.

Other actions, such as increased funding for the ECIP and investigation of alternate fuel sources generally require heavy capital investment over a fairly long period of time, so they would not likely be of great value in dealing with the problem in the near future.

The problems affecting the rate stabilization program at a PWC could be solved in at least two ways. First, the guidance provided for preparing the A-11 budgets could be amended to provide greater latitude to the PWCs in establishing realistic utilities rates. This would have the advantage of preserving the integrity of the stabilized rate program but it would shift the problem of paying the higher rates to the customer activities whose budgets may still be constrained.

Second, the problem could be handled in a manner similar to that for ungraded civilian personnel, i.e., the budget guidance could be left in effect and the likelihood of operating losses could be anticipated. The corpus of the PWC could then be reimbursed from reserves once the losses are actually incurred.

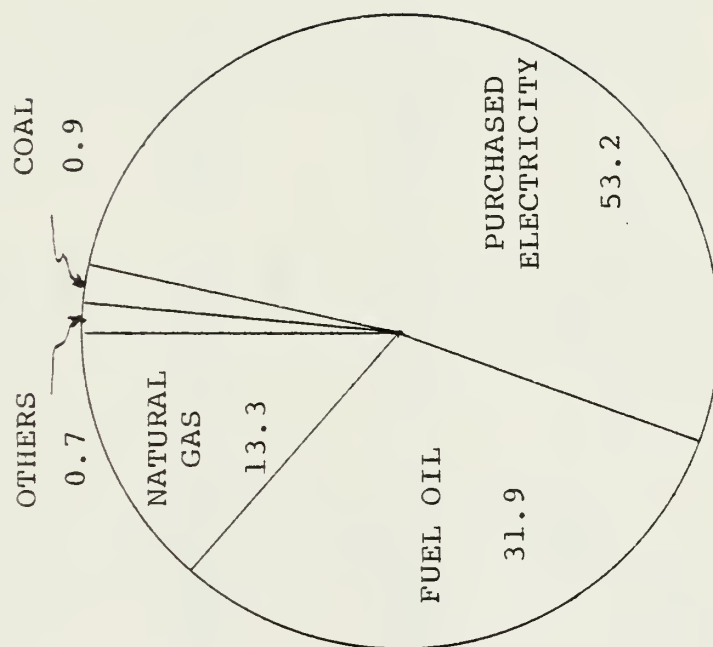
APPENDIX 1

PWC SFRAN Predetermined Rates & Applied Overhead Rates from Inception Through FY 1979

		F I S C A L Y E A R S					Proposed FY 1980
		(Avg for) FY 1975	FY 1976 & FY 1977	FY 1977	FY 1978	FY 1979	
Electricity	MWH	18.873	30.806	43.267	50.00	41.00	51.30
Water	KGAL	.353	.632	.786	.87	.95	1.20
Steam	MBTU	2.300	3.192	4.502	6.29	5.00	6.20
Sewage	KGAL	.389	.484	.717	.82	1.05	1.05
Industrial Waste (Effective 3/1/77)	KGAL	-	-	45.00	48.00	30.00	43.30
Gas	MBTU	1.152	1.764	2.323	3.25	2.30	3.10
Compressed Air	KCF	.150	.29	.399	.48	.30	.35
Telephone (T.I. only)	MAINLINES	17.55	19.65	24.73	26.85	20.00	28.70
Emergency/Service	HR	14.50	17.28	21.27	23.25	23.25	26.80
Pest Control	HR	14.41	17.23	20.83	22.47	23.25	26.20
Driver License/Renewal	EACH	5.00	7.00	8.00	9.00	10.00	11.00
Refuse Collection & Disposal	CU YD	1.65	2.06	2.69	3.19	3.50	3.90

APPENDIX 2

UTILITIES CONSUMED BY THE NAVY SHORE ESTABLISHMENT AS A PERCENT OF TOTAL ENERGY USED IN 1977



APPENDIX 3

NAVY UTILITY COSTS ASSUMING REAL COST GROWTH PLUS GENERAL INFLATION (NO ENERGY CONSERVATION)

FISCAL YEAR	UNIT OF MEASURE	ELECTRICITY	FUEL OIL	NATURAL GAS	COAL	OTHERS	TOTAL
1979	Quantity	80,511,134	51,811,454	23,865,298	1,549,866	1,498,874	
	Unit Price	3.16	2.96	2.60	1.93	4.87	
	Cost	254.4	153.4	62.1	3.0	7.3	480.2
1980	Quantity	80,511,134	51,811,454	23,865,298	1,549,866	1,498,874	
	Unit Price	3.48	3.26	3.06	2.09	5.26	
	Cost	280.2	168.9	73.0	3.2	7.9	533.2
1981	Quantity	80,511,134	51,811,454	23,865,298	1,549,866	1,498,874	
	Unit Price	3.86	3.57	3.61	2.25	5.68	
	Cost	310.8	185.0	86.2	3.5	8.5	594.0

QUANTITIES IN MBTU EQUIVALENTS
COSTS IN MILLIONS OF DOLLARS

APPENDIX 4

NAVY UTILITY COSTS ASSUMING
REAL COST GROWTH PLUS GENERAL INFLATION
(ENERGY CONSERVATION IN EFFECT)

FISCAL YEAR	UNIT OF MEASURE	ELECTRICITY	FUEL OIL	NATURAL GAS	COAL	OTHERS	TOTAL
1979	Quantity	79,706,022	51,293,339	23,626,645	1,534,367	1,483,885	
	Unit Price	3.16	2.96	2.60	1.93	4.87	
	Cost	251.9	151.8	61.4	3.0	7.2	475.3
1980	Quantity	78,908,961	50,780,406	23,390,378	1,519,023	1,469,046	
	Unit Price	3.48	3.26	3.06	2.09	5.26	
	Cost	274.6	165.5	71.6	3.2	7.7	522.6
1981	Quantity	77,230,728	49,764,797	22,922,521	1,488,643	1,439,665	
	Unit Price	3.86	3.57	3.61	2.25	5.68	
	Cost	298.5	177.7	82.8	3.3	8.2	570.5

QUANTITIES IN MBTU
COSTS IN MILLIONS OF DOLLARS

APPENDIX 5

NAVY UTILITY COSTS ASSUMING GENERAL INFLATION ONLY (NO ENERGY CONSERVATION IN EFFECT)

FISCAL YEAR	UNIT OF MEASURE	ELECTRICITY	FUEL OIL	NATURAL GAS	COAL	OTHERS	TOTAL
1979	Quantity	80,511,134	51,811,454	23,865,298	1,549,866	1,498,874	
	Unit Price	3.03	2.87	2.34	1.90	4.79	
	Cost	243.1	148.7	55.8	2.9	7.2	457.7
1980	Quantity	80,511,134	51,811,454	23,865,298	1,549,866	1,498,874	
	Unit Price	3.21	3.04	2.48	2.02	5.08	
	Cost	257.8	157.5	59.2	3.1	7.6	485.2
1981	Quantity	80,511,134	51,811,454	23,865,298	1,549,866	1,498,874	
	Unit Price	3.40	3.22	2.63	2.14	5.39	
	Cost	273.3	167.1	62.7	3.3	8.1	514.5

QUANTITIES IN MBTU'S
COSTS IN MILLIONS OF DOLLARS

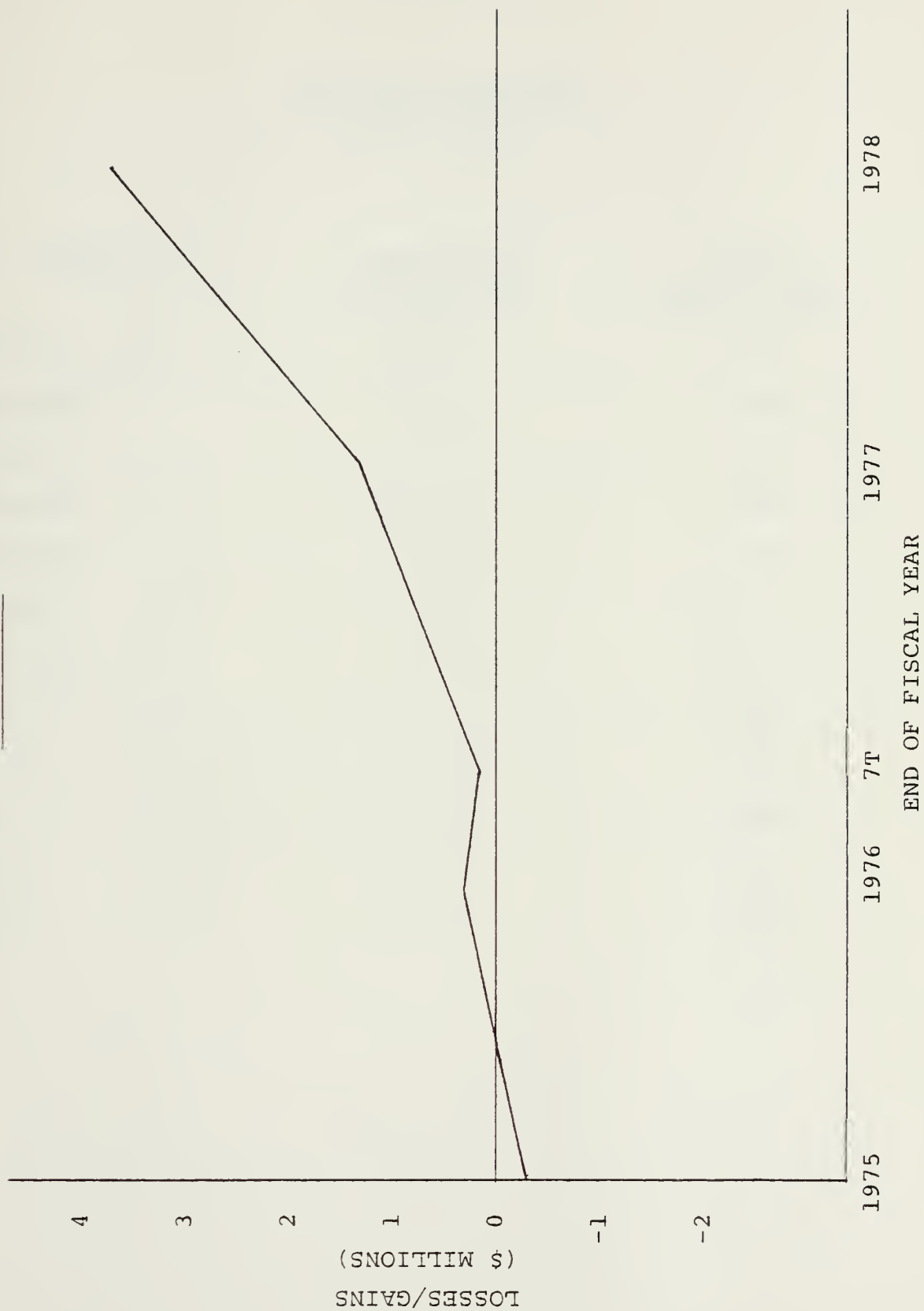
APPENDIX 6

NAVY UTILITY COSTS ASSUMING GENERAL INFLATION ONLY (ENERGY CONSERVATION IN EFFECT)

FISCAL YEAR	UNIT OF MEASURE	ELECTRICITY	FUEL OIL	NATURAL GAS	COAL	OTHERS	TOTAL
1979	Quantity	79,706,022	51,293,339	23,626,645	1,534,367	1,483,885	
	Unit Price	3.03	2.87	2.34	1.90	4.79	
	Cost	24.15	147.2	55.3	2.9	7.1	454.0
1980	Quantity	78,908,961	50,780,406	23,390,378	1,519,023	1,469,046	
	Unit Price	3.21	3.04	2.48	2.02	5.08	
	Cost	253.3	154.4	58.0	3.1	7.5	476.3
1981	Quantity	77,330,728	49,764,747	22,922,531	1,488,643	1,439,665	
	Unit Price	3.40	3.22	2.63	2.14	5.39	
	Cost	262.9	160.2	60.3	3.2	7.8	494.4

QUANTITIES IN MBTU'S
COSTS IN MILLIONS OF DOLLARS

APPENDIX 7



APPENDIX 8

PURCHASED UTILITIES UNIT COSTS

<u>MONTH</u>		<u>ELECTRICITY</u>	<u>GAS</u>
		Cost Per MWH	Cost Per MBTU
AUGUST	1977	42.205	2.248
SEPTEMBER	1977	39.134	2.247
OCTOBER	1977	37.878	2.123
NOVEMBER	1977	38,017	2.250
DECEMBER	1977	38.468	2.251
JANUARY	1978	37.710	2.251
FEBRUARY	1978	38.397	2.397
MARCH	1978	37.597	2.252
APRIL	1978	37.781	2.252
MAY	1978	37.230	2.249
JUNE	1978	37.020	2.252
JULY	1978	32.601	2.253

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